

See
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--17. A method of manufacturing a semiconductor integrated circuit device, comprising the steps of:

- (a) providing a silicon wafer covered with an insulating film whose main surface is mainly formed of silicon oxide;
- (b) cleaning the surface of said silicon wafer by a sheet-by-sheet manner with use of a processing solution containing hydrogen peroxide, hydricid fluoride salt, and water;
- (c) removing said insulating film after said step (b) thereby to expose the surface of said silicon wafer; and
- (d) subjecting said silicon wafer to a heat-treatment after said step (c) thereby to form a gate oxide film over said silicon wafer.

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18. A method of manufacturing a semiconductor integrated circuit device according to claim 17, wherein the hydricid fluoride salt included in said processing solution is ammonium fluoride.

19. A method of manufacturing a semiconductor integrated circuit device according to claim 17, wherein the hydricid fluoride salt included in said processing solution is tetraalkyl ammonium fluoride.

20. A method of manufacturing a semiconductor integrated circuit device according to claim 17, wherein said processing solution includes HF and HF_2^- as etching seeds of silicon oxide.

21. A method of manufacturing a semiconductor integrated circuit device according to claim 17, wherein concentration of said hydricid fluoride salt in said processing solution is in a range of about 0.1 to 3 mol/l.

22. A method of manufacturing a semiconductor integrated circuit device according to claim 17, wherein said processing solution further includes a surfactant.

23. A method of manufacturing semiconductor integrated circuit device according to claim 17, further comprising a step of cleaning the surface of said silicon wafer during ultrasonic vibration of said processing solution.

24. A method of manufacturing a semiconductor integrated circuit device according to claim 17, wherein, after said step (c), the heat treatment in said step (d) is performed without exposing said silicon wafer to atmosphere.

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25. A method of manufacturing a semiconductor integrated circuit device according to claim 17, wherein said cleaning is performed at a temperature as low as 40°C.

26. A method of manufacturing a semiconductor integrated circuit device according to claim 17, wherein the processing solution has a pH in a range of 6 to 11.

27. A method of manufacturing a semiconductor integrated circuit device according to claim 26, wherein the processing solution further includes a surfactant.

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28. A method of manufacturing a semiconductor integrated circuit device according to claim 17, wherein the heat treatment forming the gate oxide film, in step (d), is performed in a mixed atmosphere of water and oxygen, at a temperature in a range of 800°-900°C.

29. A method of manufacturing a semiconductor integrated circuit device according to claim 17, wherein after removing said insulating film in step (c), the silicon wafer is dried prior to step (d).

30. A method of manufacturing a semiconductor integrated circuit

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cont. device according to claim 29, wherein after said drying the silicon wafer is immediately transferred to a chamber for the step (d) of subjecting the silicon wafer to the heat-treatment thereby to form the gate oxide film.--
